Swinomish Indian Tribal Community
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This letter is intended to provide a brief background on the Swinomish Water Quality Standards Code, including the sources used for development of numeric and narrative water quality criteria, and the rationale behind the approach used by the Tribe in developing the Standards.

1.0 PURPOSE OF STANDARDS

The Swinomish Water Quality Standards Code was developed to provide a mechanism for managing and regulating the quality of surface waters of the Swinomish Indian Reservation by establishing water quality goals for all surface waters, and by providing a legal basis for regulatory controls. The specific purposes of the Standards, as stated in Section 19-06.020, are as follows:

> To promote, protect, and enhance the peace, safety, health, general welfare, economic security, and political and cultural integrity of the Tribe and its members, and the peace, safety, health, and general welfare of all those who live or work on or visit the Reservation from the harmful effects of surface water contamination;
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> To restore, maintain, and enhance the chemical, physical, biological, and radiological quality of Regulated Surface Waters in order to, wherever attainable, support protection and propagation of fish, shellfish, wildlife, recreation, and cultural uses in and on Regulated Surface Waters;
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> To prevent degradation of the quality of Regulated Surface Waters and restore impaired Regulated Surface Waters to a level of water quality that provides for all beneficial and designated uses, including public water supply, propagation of fish, shellfish, wildlife, and plant species, recreational purposes, navigation, and permissible out-of-stream purposes, by establishing standards for the quality of Regulated Surface Waters; and
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> To provide a regulatory basis for applying established water quality standards to prevent, reduce, or eliminate the discharge of pollutants into Regulated Surface Waters.

The Standards were developed based on the specific needs and goals of the Swinomish Indian Tribal Community, as well as the requirements of the Clean Water Act, federal water quality regulations, federal water quality criteria and guidance, and in consideration of Washington State water quality standards applicable to adjacent waters.

The following sections are intended to discuss in more detail the separate elements of the Tribe's Standards, including designated uses of waters, numeric and narrative criteria for protecting those uses, provisions for protecting existing water quality (antidegradation), discretionary policies, and implementation procedures.

2.0 DESIGNATED USES

All regulated surface waters of the Swinomish Indian Reservation are designated to meet the "fishable/swimmable" goal of Section 101(a)(2) of the Clean Water Act, which includes protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water.

Designated uses that apply to all freshwaters of the Reservation include salmon and trout fish use, primary contact recreation, and miscellaneous uses including aesthetic quality, spiritual and cultural uses, and wildlife uses. Additional designated uses assigned to specific freshwaters include fish and shellfish harvest, domestic water supply, and commerce, navigation and boating.

Designated uses that apply to all marine waters include salmonid and other fish rearing and migration use, fish and shellfish harvest, primary contact recreation, and miscellaneous uses including aesthetic quality, spiritual and cultural uses, wildlife uses, and commerce, navigation and boating. An additional designated use assigned to specific marine waters includes seafood processing.

3.0 WATER QUALITY CRITERIA

3.1 Numeric Criteria

3.1.1 Conventional Parameters

Conventional parameters generally provide measures and limits related to the effects of what are defined in the water quality regulations as "conventional pollutants", such as bacteriological pollutants, heat, biochemical oxygen demand, and sediment. Conventional water quality parameters such as temperature, dissolved oxygen, pH, and bacteriological requirements are basic to all Tribal and State standards (EPA, 1994). The conventional parameters in the Tribe's standards include bacteria, dissolved oxygen (DO), temperature, pH, and total dissolved gas. The criteria for all of these parameters are based on effects to aquatic organisms with the exception of the bacteriological criteria, which are based on human health effects.

3.1.1.1 Bacteria

The freshwater bacteriological criteria in the Tribe's Standards are based on the use of enterococci (or E.Coli) and total coliform as indicator organisms. All freshwaters must meet bacteriological criteria to protect human health during primary contact recreation, and are based on the recommended federal criteria for enterococci (or E.Coli) (EPA, 2012). Additionally, freshwaters designated for fish and shellfish harvest must also meet a total coliform criterion which is based on the recommended standards by the National Shellfish Sanitation Program (USFDA, 2015).

The marine water bacteriological criteria in the Tribe's Standards are also based on the use of enterococci and total coliform as indicator organisms. All marine waters must meet bacteriological criteria to protect human health during primary contact recreation, and are based on the recommended federal criteria for enterococci (EPA, 2012). Additionally, all marine waters designated for fish and shellfish harvest must also meet a total coliform criterion which is based on the recommended standards by the National Shellfish Sanitation Program (USFDA, 2015).

3.1.1.2 Dissolved Oxygen

The freshwater dissolved oxygen criterion in the Tribe's standards is based on, and at least as stringent as, EPA recommended criteria (EPA, 1986). The Tribe's freshwater criterion is identical to the Washington State dissolved oxygen criterion for "core summer salmonid habitat" (WAC 173-201A).

The marine water dissolved oxygen criterion in the Tribe's standards is identical to the Washington State dissolved oxygen criterion for the "excellent quality" marine aquatic life use designation (WAC 173-201A).

3.1.1.3 Temperature

The Tribe's temperature criteria are based on EPA Region 10 guidance for temperature water quality standards (EPA, 2003). The temperature criteria for both freshwaters and marine waters are identical to the EPA recommended criteria for "Salmon/Trout Core Juvenile Rearing", and are identical to the Washington State freshwater temperature criterion for "core summer salmonid habitat", and the Washington State marine water temperature criterion for the "excellent quality" marine aquatic life use designation (WAC 173-201A).

3.1.1.4 Other Conventional Parameters

The Tribal criteria for pH, and total dissolved gas are consistent with federal guidance and are identical to Washington State criteria for these parameters.

3.1.2 Toxics Criteria

3.1.2.1 Aquatic Life

For the protection of aquatic life, numeric criteria for toxic priority pollutants, based on both chronic and acute toxicity to aquatic organisms, are included in the Tribal Standards and are applicable to all surface waters of the Swinomish Reservation. All toxics criteria for aquatic life in the Tribe's Standards are based on the National Recommended Water Quality Criteria (http://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-

table) with exceptions noted below. In some cases these criteria differ somewhat from Washington State's aquatic life toxics criteria. EPA regularly publishes criteria for priority pollutants pursuant to Section 304(a) of the Clean Water Act, and the most recent compilation, used as the basis for the Tribal Standards, reflects the latest scientific knowledge.

Selenium

The Tribe's chronic Selenium criterion for fresh water is based on the draft EPA recommended selenium criterion (EPA-822-P-15-001, July 2015) as the draft criterion currently reflects the best available science. The final EPA 304(a) criterion for Selenium will be adopted by the Tribe if the EPA's recommended selenium criterion is finalized and available before the Tribe adopts our WQS. If the selenium criterion is not finalized prior to Tribal adoption, the Tribe will adopt the draft selenium criterion.

Cadmium

The Tribe's Cadmium criteria for fresh and marine waters are based on the draft EPA Cadmium criteria (EPA-820-D-15-003, November 2015) as the draft criteria currently reflect the best available science. The final EPA 304(a) criteria for Cadmium will be adopted by the Tribe if the criteria are finalized and available before the Tribe adopts our WQS. If the Cadmium criteria are not finalized prior to Tribal adoption, the Tribe will adopt the draft Cadmium criteria.

3.1.2.2 Human Health

Criteria for the protection of human health were developed based on the EPA guidance document *"Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health"* (EPA, 2000), and, for 94 priority pollutants, on toxicity and bioaccumulation factors published by EPA in June 2015 as part of an update of the national recommended water quality criteria for human health. The exposure assumptions and other factors included in the development of the Tribe's human health criteria are discussed in the following sections.

Body Weight

The Tribe's human health criteria include a body weight of 80 kilograms, which represents the mean body weight for adults ages 21 and older.

Drinking Water Intake

The Tribe's human health criteria include a drinking water intake rate of 3 liters/day, based on national data from 2003 to 2006 for all sources of water at the 90th percentile for adults ages 21 and older.

Fish Consumption

A fish consumption rate specific to the Swinomish Indian Tribal Community was determined following EPA's recommended methodology. Because the level of fish intake in highly exposed

populations varies by geographical location, EPA suggests a "four preference hierarchy" to follow when deriving consumption rates that encourages the use of the best local, State, or regional data. The four preference hierarchy is: (1) use of local data; (2) use of data reflecting similar geography/population groups; (3) use of data from national surveys; and (4) use of EPA's default intake rates. This recommended four preference hierarchy is intended for evaluating fish intake from fresh and estuarine species only, and EPA recommends that "data indicative of fresh/estuarine species only be used which is, by and large, most appropriate for developing AWQC" (EPA, 2000).

To develop appropriate fish consumption rates for Swinomish members, the Tribe relied on local data collected characterizing current consumption rates and patterns for Swinomish Tribal members. The selected rate represents the 95th percentile overall consumption rate of fish and shellfish, which was determined to be 384 grams/day with a diet composition of 47% finfish and 53% shellfish..

To apply the trophic level-based bioaccumulation factors published by EPA as part of the June 2015 national criteria update, the overall fish and shellfish consumption rate was further broken down by trophic level, based on the average diet composition from the Swinomish Tribal fish consumption survey, and on best professional judgment regarding the proportion of individual species or species groups consumed.

The trophic level-based fish consumption rates used for calculating the Tribe's criteria are:

- Trophic Level 2: 136 grams/day (66% of shellfish as bivalves (clams, oysters, etc.)
- Trophic Level 3: 18 grams/day (10% of finfish as herring, sole, flounder, etc)
- Trophic Level 4: 230 grams/day (90% of finfish as salmon, trout, halibut, etc. and 33% of shellfish as crab)

For those priority pollutants not included in EPA's June 2015 draft update, criteria were calculated using EPA's previously published chemical-specific bioconcentration factors and an overall consumption rate of 384 grams/day.

Toxicity Factors

The Tribe's human health criteria were calculated using the most recently published toxicity factors, including those published as part of the June 2015 criteria update.

Bioaccumulation Factors

The Tribe's human health criteria were calculated using the most recently published trophic level-specific bioaccumulation factors, including those published as part of the June 2015 criteria update. For those pollutants not included in the June 2015 update, the criteria were calculated using previously published chemical-specific bioconcentration factors.

Cancer Risk Level

For carcinogens, the human health criteria were calculated using a target risk level of 1 x 10^{-6}.

Relative Source Contribution

For non-carcinogens, the human health criteria were calculated using a relative source contribution of 20 percent, as recommended in EPA's human health criteria methodology (EPA, 2000).

Human Health Criteria Calculations

The equation for calculating human health water quality criteria for carcinogens* is as follows:

$$AWQC = \frac{\left(\frac{RL}{CSF}\right) * BW * UCF}{DI + ((FCR2 * BAF2) + (FCR3 * BAF3) + (FCR4 * BAF4))}$$

RL = risk level (1 x 10^{-6})
CSF = cancer slope factor (chemical specific)
BW = body weight (80 kg)
UCF = unit conversion factor
DI = drinking water intake (2.4 liters/day)
FCR2 = fish consumption rate, trophic level 2
BAF2 = bioaccumulation rate , trophic level 2
FCR3 = fish consumption rate, trophic level 3
BAF3 = bioaccumulation rate , trophic level 3
FCR4 = fish consumption rate, trophic level 4
BAF4 = bioaccumulation rate , trophic level 4

* EPA's 2005 cancer guidelines note that some carcinogens may have a non-linear dose response relationship and that the toxicity of these chemicals is more appropriately evaluated using a methodology similar to that employed for reference dose derivation. The treatment of A WQC for non-linear carcinogens is provided in the EPA's 2000 Methodology for deriving Ambient Water Quality Criteria for the Protection of Human Health. To date, only a small number of carcinogens have toxicity values based on a non-linear mode ofaction. None of the Swinomish Tribe's AWQC are calculated with carcinogenicity parameters based on a non-linear mode of action

The equation for calculating human health water quality criteria for non-carcinogens is as follows:

$$AWQC = \frac{RfD * RSC * BW * UCF}{DI + ((FCR2 * BAF2) + (FCR3 * BAF3) + (FCR4 * BAF4))}$$

Rfd = reference dose (chemical specific)
RSC = relative source contribution (0.2)
BW = body weight (80 kg)

UCF = unit conversion factor
DI = drinking water intake (2.4 liters/day)
FCR2 = fish consumption rate, trophic level 2
BAF2 = bioaccumulation rate , trophic level 2
FCR3 = fish consumption rate, trophic level 3
BAF3 = bioaccumulation rate , trophic level 3
FCR4 = fish consumption rate, trophic level 4
BAF4 = bioaccumulation rate , trophic level 4

3.2 Narrative Criteria

Narrative Criteria included in Section 19-06.150 of the Standards are based on or consistent with federal guidance (EPA, 1994). The narrative criteria are intended to meet the intent of the Clean Water Act, and are not significantly different than provisions included in the Washington State standards.

4.0 ANTIDEGRADATION POLICY AND IMPLEMENTATION PROCEDURES

The Tribe's Antidegradation Policy is based on federal requirements and guidance (EPA, 1994). The Implementation Procedures, included as an appendix to the Standards, were developed based on a Model Antidegradation Implementation Procedure developed by EPA Region 8 (EPA, 1993), and on procedures included in other approved Tribal standards (including the Ute Mountain Ute Tribe Antidegradation Implementation Policy).

5.0 DISCRETIONARY POLICIES

Discretionary policies, including provisions for mixing zones, compliance schedules, and variances are included in the Tribal Standards. . Provisions for determining under what circumstances the Tribe may allow for compliance schedules for existing activities and for variances to water quality standards are based on EPA guidance.

Technical References for the Swinomish Water Quality Standards

U,S, Food and Drug Administration, 2015. National Shellfish Sanitation Program, Guide to the Control of Molluscan Shellfish, 2015 Revision. Silver Spring, MD 20993

U.S. Environmental Protection Agency (EPA). 1986. *Quality Criteria for Water*. Office of Water Regulations and Standards. Washington. DC 20460. May 1, 1986.

U.S. Environmental Protection Agency (EPA). 1993. *EPA Region VIII Guidance: Antidegradation Implementation. Requirements, Options, and EPA Recommendations Pertaining to State/Tribal Antidegradation Programs*. August 1993

U.S. Environmental Protection Agency (EPA). 1994. *Water Quality Standards Handbook, Second Edition*. Water Quality Standards Branch, Office of Science and Technology, U.S. Environmental Protection Agency, Washington, DC, September 1993 (Updated August 1994).

U.S. Environmental Protection Agency (EPA). 2000. *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*. Office of Water, Office of Science and Technology, U.S. Environmental Protection Agency, Washington, DC. October 2000.

U.S. Environmental Protection Agency (EPA). 2003. *EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards.* EPA 910-B-03-002. Region 10 Office of Water, Seattle, WA.

U.S. Environmental Protection Agency (EPA). 2012. *Recreational Water Quality Criteria*. Office of Water, U.S. Environmental Protection Agency, Washington, DC. 2012.

U.S. Environmental Protection Agency (EPA). 2013. National Recommended Water Quality Criteria. Office of Water, U.S. Environmental Protection Agency, Washington, DC. 2013.

U.S. Environmental Protection Agency (EPA). 2015. Updated National Recommended Water Quality Criteria for the Protection of Human Health, EPA 820-F-15-001. June 2015.

EPA. 2007. Aquatic Life Ambient Freshwater Quality Criteria – Copper, 2007 Revision. EPA-822-R-07-001. U.S. EPA Office of Water, Washington, D.C. February 2007. http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/copper/upload/2009_04_27_criteria_copper_2007_criteria-full.pdf

EPA. 2015. Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2015. EPA 822-P-15-001. U.S. EPA Office of Water, Washington, D.C. July 2015. See http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/selenium/index.cfm.

EPA, 2015. Draft Aquatic Life Ambient Water Quliaty Criteria Cadmium – 2015. EPA-820-D-15-003. U.S. EPA Office of Water, Washington, D.C. November 2015. http://www.epa.gov/sites/production/files/2015-11/documents/cadmium-draft-criteria-2015.pdf